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REMARKS

Claims 1, 5-20, 24-26, 50-57, 66-74 and 76-84 were pending for the final Office Action dated September 12, 2003 and the Advisory Action date November 10, 2003. Claims 1, 5-9, 11-20, 24-26, 66-74 and 76 have been allowed. Claims 10, 50-57 and 77-84 stand rejected under various grounds. The Office Action and the Advisory Action have been carefully considered. In light of the amendments presented above and the following remarks, reconsideration and allowance of the subject application are hereby requested.

Independent Claim 10

As discussed in Applicant's previous response, with regard to the '406 application, and as illustrated in Figures 3, 13, etc., even assuming arguendo that the ladle 10 could be considered a holding vessel and that the vessel 30 is a forming vessel, there is no indication or suggestion that the temperature of the liquid metal contained within the ladle 10 is "controllably adjusted to a selected transfer temperature", as recited in independent claim 10. Instead, the liquid alloy M_1 contained within the ladle 10 is exposed to uncontrolled ambient cooling. There is no indication in the '406 application, either expressed or implicit, which teaches that the temperature of the molten metal in the ladle 10 is "controllably adjusted" in any manner whatsoever.

In the Advisory Action, the vessel 30 is referred to as a holding vessel that is controlled by heating coils. Additionally, the injection sleeve or runner 180 is referred to as a forming vessel. However, even assuming arguendo that the sleeve 180 is a forming vessel, the material that is transferred from the vessel 30 to the sleeve 180 no longer comprises a

liquid alloy M_1 (i.e., a metallic melt), but is instead partially solidified to define a semi-solid billet M_2 . Therefore, the recitation in independent claim 10 of “regulating the transfer of an amount *of the metallic melt*” from the holding vessel into a forming vessel is not satisfied by the teachings of the ‘406 application. Moreover, independent claim 10 recites that the forming vessel is “*temperature-controlled*” so as to facilitate “*crystallizing the metallic melt . . . by cooling the metallic melt at a controlled rate to form a semi-solid material*”. However, there is no teaching or suggestion in the ‘406 application that the sleeve 180 is temperature-controlled so as to cool the material contained therein at a controlled rate. Additionally, crystallization of the liquid alloy M_1 to form the semi-solid billet M_2 occurs in the vessel 30 via the temperature control provided by the heating coils. Once transferred into the sleeve 180, the metallic material already comprises a semi-solid billet M_2 . The semi-solid billet M_2 is neither cooled at a controlled rate nor crystallized within the sleeve 180. Finally, independent claim 10 recites a temperature-controlled holding vessel for controllably adjusting the temperature of a metallic melt and a temperature-controlled forming vessel for cooling the metallic melt at a controlled rate. However, the ‘406 application includes but a single temperature-controlled vessel 80 (temperature control via the heating coils). Therefore, the ‘406 application fails to teach or suggest the subject matter recited in independent claim 10.

For at least the forgoing reasons, independent claim 10 is distinguishable over the ‘406 application and any of the other art of record, whether considered along or in combination. Accordingly, withdrawal of the rejection of independent claim 10 is respectfully requested.

Independent claim 50

In the Advisory Action, it is stated that “EP ‘406 discloses feeding the metal directly into the mold, but not performed by a ‘single integrated structure’ as argued by the applicant”. It is also stated that “such argument is not claimed”. The Applicant respectfully disagrees with this assertion. Although a “single integrated structure” is not expressly recited in independent claim 50, the functions associated with the temperature-controlled vessel are expressly recited. Specifically, independent claim 50 recites the following: “crystallizing the metallic melt in the temperature-controlled vessel by cooling the metallic melt at a controlled rate less . . . produce a semi-solid material” and “feeding the semi-solid material from the temperature-controlled vessel directly into the mold without transferring the semi-solid material to an intermediate container. This process is clearly shown in Figure 9 of the subject application, where semi-solid material S is formed in the temperature-controlled vessel 80, which is in turn fed directly into the mold 90 to form a shaped article. As the Applicant stated in the previous response, the functions associated with forming the semi-solid material and feeding the semi-solid material into the mold are performed by a single, integrated structure (i.e., the temperature-controlled vessel). However, with regard to the ‘406 application, the semi-solid metal M₂ is formed within the vessel 30, is transferred from the vessel 30 into the injection sleeve 180, and is then fed from the sleeve 180 into the die mold 60. The vessel 30 is therefore not associated with each of the functions recited in independent claim 50.

Nevertheless, in order to advance prosecution of the subject application, the Applicant has cancelled independent claim 50 without prejudice for possible consideration in a

continuing application, and has rewritten independent claim 51 in independent form.

Rewritten independent claim 51 recites that the temperature-controlled vessel within which the semi-solid material is formed (i.e., crystallizing liquid melt via cooling at a controlled rate) includes a passage for receiving the metallic melt and a ram displaceable along the passage for feeding the semi-solid material directly into the mold. The Applicant points out that the '406 application fails to teach or even suggest that the vessel 30 within which the semi-solid metal M₂ is formed includes the features recited in rewritten independent claim 51. Specifically, the vessel 30 does not include a ram displaceable along a passage for injecting semi-solid material directly into a mold by displacing the ram along the passage, and without transferring the semi-solid material to an intermediate container. Moreover, while the injection sleeve 180 may arguably include these features, the injection sleeve 180 is not temperature-controlled, nor is the semi-solid billet M₂ crystallized within the sleeve 180 via cooling at a controlled rate. To the contrary, crystallizing and formation of the semi-solid material occurs within the vessel 30. Therefore, the system disclosed in the '406 application includes a forming vessel 30 and a separate injection sleeve 180, with the semi-solid metal M₂ being transferred from the vessel 30 to the injection sleeve 180, and then into the mold 60. This is clearly different from the claimed invention wherein the temperature-controlled vessel includes a passage and a ram (i.e., an integrated structure) for both crystallizing the metallic melt via cooling at a controlled rate to produce a semi-solid material and for feeding the semi-solid material from the temperature-controlled vessel directly into a mold without transferring the semi-solid material into an intermediate container.

The Applicant submits that rewritten independent claim 51 is clearly distinguishable over the '406 application and any of the other art of record, whether considered along or in combination. Accordingly, withdrawal of the rejection of rewritten independent claim 51 is respectfully requested. Dependent claims 55, 57, 77, 79-81, 83 and 84 have been rewritten to depend from independent base claim 51. The claims depending from rewritten independent claim 51 are patentable for at least the reasons supporting the patentability of independent base claim 51.

CONCLUSION

In view of the foregoing amendments and remarks, it is respectfully submitted that Applicant's application is now in condition for allowance with now pending claims 1, 5-20, 24-26, 51-57, 66-74 and 76-84.

Reconsideration of the present application, as amended, is respectfully requested. Timely action towards a Notice of Allowability is hereby solicited. The Examiner is encouraged to contact the undersigned by telephone to resolve any outstanding matters concerning the present application.

Respectfully submitted,

By: 

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